PLUS 300
EXPERT U THR

Use and maintenance manual

ENGLISH

READ AND KEEP

REV. 02-15
ENG

ELECTRICAL BOARDS FOR REFRIGERATING INSTALLATIONS

Electrical Boards Pego®

Thanks for choosing this PEGO electrical panel.

This manual gives detailed information on installation, use and maintenance of PLUS300 EXPERT U THR series electrical panels and special version. Our products are designed and built in compliance with current standards, on the specific field of refrigeration and conditioning systems. A different use is allowed respecting the working conditions for which the panel is designed and made.
Before using the panel it's suggested to fully read this manual paying special attention to the highlighted parts with the simbology descripted below:

This symbol is used to focus on notes concerning installation, use and maintenance operations

This symbol is used to focus on important notes

This symbol is used to indicate the prohibition to do the shown operation

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CHAPTER 1: INTRODUCTION

1.1 GENERAL FEATURES

DESCRIPTION:

Three-phase electrical panel for temperature and humidity control for evaporating unit with electrical heaters for hot.
To match with a compressor rack or a remote condensing unit.
Magnetothermic circuit breaker protection accessible from the front panel added to an innovative form makes this panel a perfect and functional choice to provide safety, protection, control of temperature and humidity with specific seasoning functions.
Programming up to five recipes, of seven phases each, settable and customizable (the usable functions depend on the type of the panel).
Collectively the panel permits to control cold solenoid, condensing unit enabling, hot heaters, ventilation (up to 800W), cold room light, humidification enabling, air exchange, pauses, de-humidification, defrosts (up to 7500W), alarms.

APPLICATIONS:

- Seasoning/drying rooms.
- Germination rooms with day/night cycles.
- Storage rooms with or without humidity control.

MAIN FEATURES:

- Backlit LCD screen.
- Clock and calendar.
- Manual or automatic mode.
- Up to 5 formula completely customazible automatic management of 7 phases for each formula (dripping first phase, seasoning/conservation last phase). simple programming and selection of set formula. possibility of join together more formula for exceeding the 7 phases limit.
- Heat and humidity can be excluded to manage storage cells with defrost activation.
- Temperature to one decimal point.
- Password for keypad lock.
- Day/night cycle for germination systems with double set-point.
- Dehumidification program with cold or heat call.

PRODUCT IDENTIFICATION CODE 1.2

110P30EUTHR	Temperature and humidity control for seasoning, preservation and industrial processes.

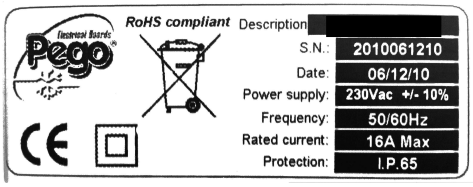
DIMENSIONS 1.3

Dimensions in mm.

IDENTIFICATION DATA 1.4

The unit described in this manual has an ID plate on its side showing the relevant ID data:

- Manufacturer name
- Device code
- Serial number
- Date
- Power supply
- Frequency
- Rated current
- Protection (IP)



CHAPTER 2: INSTALLATION

2.1 *IMPORTANT GENERAL INFORMATION FOR THE INSTALLER*

1. Install the device in places where the protection rating is observed and try not to damage the box when drilling holes for wire/pipe seats;

2. Do not use multi-polar cables in which there are wires connected to inductive/power loads or signaling wires (e.g. probes and digital inputs);

3. Do not fit power supply wiring and signal wiring (probes and digital inputs) in the same raceways or ducts;

4. Minimize the length of connector wires so that the wiring does not have a spiral shape;

5. All wiring must be of a cross-section suitable for relevant power levels;

6. Place a general protection fuse upstream from the electronic controller;

7. When it is necessary to extend the probes, the wires must have a cross-section of at least 1 mm². The probes extension or shortening could alter the factory calibration; then check and calibrate through an external thermometer.

2.2 *KIT FOR MOUNTING*

PLUS 300 EXPERT U THR electronic controller kit, for assembling and using, contains:

• N° 4 seals, to be fitted between the fixing screws and the box back panel
• N° 1 use and maintenance manual.
• N° 1 electrical drawing.
• N° 1 drilling layout.
• N° 2 probes NTC 10K 1%

INSTALLAZIONE QUADRO 2.3

- Raise the transparent cover that shields the magneto-thermal cut-out switch and remove the screw cover on the right-hand side.

- Undo the 4 fixing screws at the front of the box.

- Open the front of the box, lift it and slide the two hinges out as far as they will go. Bend the hinges and rotate the front panel by 180° downward to get access inside the panel

- Using the furnished drilling layout make four fixing holes on the wall.
  Using holes made on previous point fix the bottom with 4 screws of a length suitable for the thickness of the wall to which the panel will be attached. Fit a o-ring (supplied) between each screw and the box backing

- Make all the electrical connections as illustrated in the diagram for the corresponding model (see relative table in APPENDICES).
  To effect correct electrical connection and maintain the protection rating, use appropriate wire/raceway grips to ensure a good seal.
  Route the wiring inside the unit in as tidy a fashion as possible: be especially careful to keep power wires away from signal wires. Use clips to hold wires in place.

- close the front panel, making sure that all the wires are inside the box and that the box seal sits in its seat properly.
  Tighten the front panel using the 4 screws, making sure the O-rings on the head of each screw are used.
  Power up the panel and carry out thorough reading/programming of all the parameters.

- Be careful not to over-tighten the closure screws as this could warp the box and compromise proper operation of the membrane-type keypad.
  Install short-circuit overload safety devices on all the power cables connected to the PLUS300 EXPERT U THR so as to prevent damage to the device. Work and/or maintenance must ONLY be carried out on the unit after disconnecting the panel from the power supply and from any inductive/power loads: doing so allows the worker to do his job safely.

FUNCTIONS MANAGED BY PLUS 300 EXPERT U THR 2.4

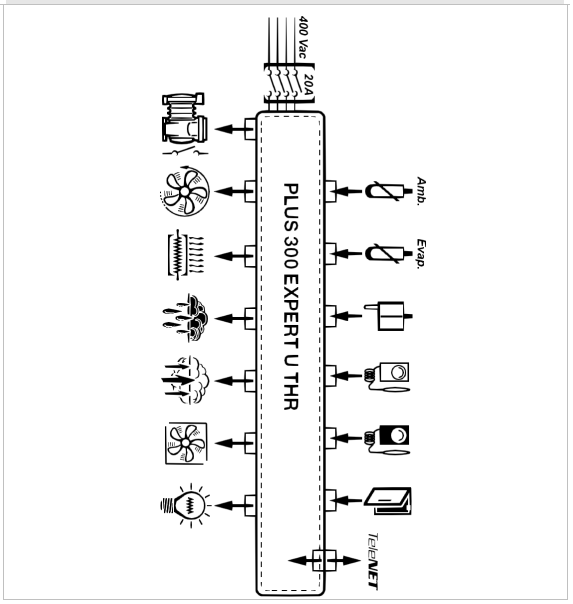
• Display and adjustment of temperature and humidity settings (neutral zone)
• Stand-by activation/deactivation
• Sensor alarms
• Air change parameter adjustment
• Defrost parameter adjustment
• Pauses parameter adjustment
• Fan parameter adjustment
• Outputs status display
• Simultaneous display of temperature and humidity
• Automatic program control with automatic variation of temperature and humidity settings over time.
• Clock function.

CHAPTER 3: TECHNICAL CHARACTERISTIC

TECHNICAL CHARACTERISTICS 3.1

Technical characteristics	Plus 300 Expert U THR
Box dimension	400 x 300 x 135mm
Weight	6 Kg
Protection rating	IP65
Power supply (3F + N + T)	400Vac ±10% 50/60Hz
Load type	three-phase
Working temperature	- 5 ÷ +40 °C
Storage temperature	-25 ÷ +70 °C
Relative ambient humidity	Dal 30% al 90% RH without condensate
Reading range	- 45 ÷ +45 °C / 0 ÷ 100% Rh
Control	PEGO THR integrated
Status indicators	Display LCD
Main switch general protection	4 poles magnetothermic 20A
Inputs	
Ambient probe	NTC 10K 1%
Evaporator probe	NTC 10K 1%
Humidity probe	4÷20mA (0 ÷ 100% Rh)
Door switch	Present
Min. temperature sensor	Present
Max temperature sensor	Present
Outputs	
Enable condensing unit	Present
Evaporator fans	800W (1ph)
Defrost	Off-cycle
Hot heaters	7500W (AC1)
Enable humidifiers	Present
Enable dehumidifiers	Present
Air change	Present
Pause	Present
Room light	Present
Alarm relay	Present
Supervision system	TeleNET

Connection diagrams:



4.1 *WARRANTY CONDITIONS*

PLUS300 EXPERT U THR series products are covered by a 24-month warranty against all manufacturing defects as from the date indicated on the product ID code or from the date of product registration card, if present.

In the event of a defect the product must be appropriately packaged and sent to our factory or any authorized Service Center by authority RMA number received.

Customers are entitled to have defective products repaired, spare parts and labour included. Transport expenses and risk shall be met entirely by the customer.
Repairs carried out under warranty do not prolong or renew the warranty expiration date.

The Warranty does not cover:

- Damages resulting from tampering, impact or improper installation of humidifier and its accessories.
- Behaviour inconsistent with Manufacturer's prescriptions and instructions.
- Damages caused by repairs made by unauthorized persons.
- Spare parts
- Damages caused by natural phenomena as lightning, natural calamities, etc.

Warranty cover may be refused if the device is modified or changed.

Under no circumstances **Pego S.r.l.** will be responsible for possible loss of data and information, costs of substitutive goods or services, damages to things, people or animals, non-sale or non-gain, activity interruption, possible direct, indirect, accidental, property, covering, punitive, special or consequential damages anyhow caused, whether they are contractual, extra-contractual or due to negligence or other responsibility, derived from product use or from its installation.

The wrong machine working caused by manumissions, shoves, inadequate installation automatically forfeits the warranty right. It is compulsory to respect all information of this user manual and device operating conditions.

PEGO S.r.l. declines any responsibility for possible errors or inaccuracies written in this manual as
a result of printing or transcription errors.

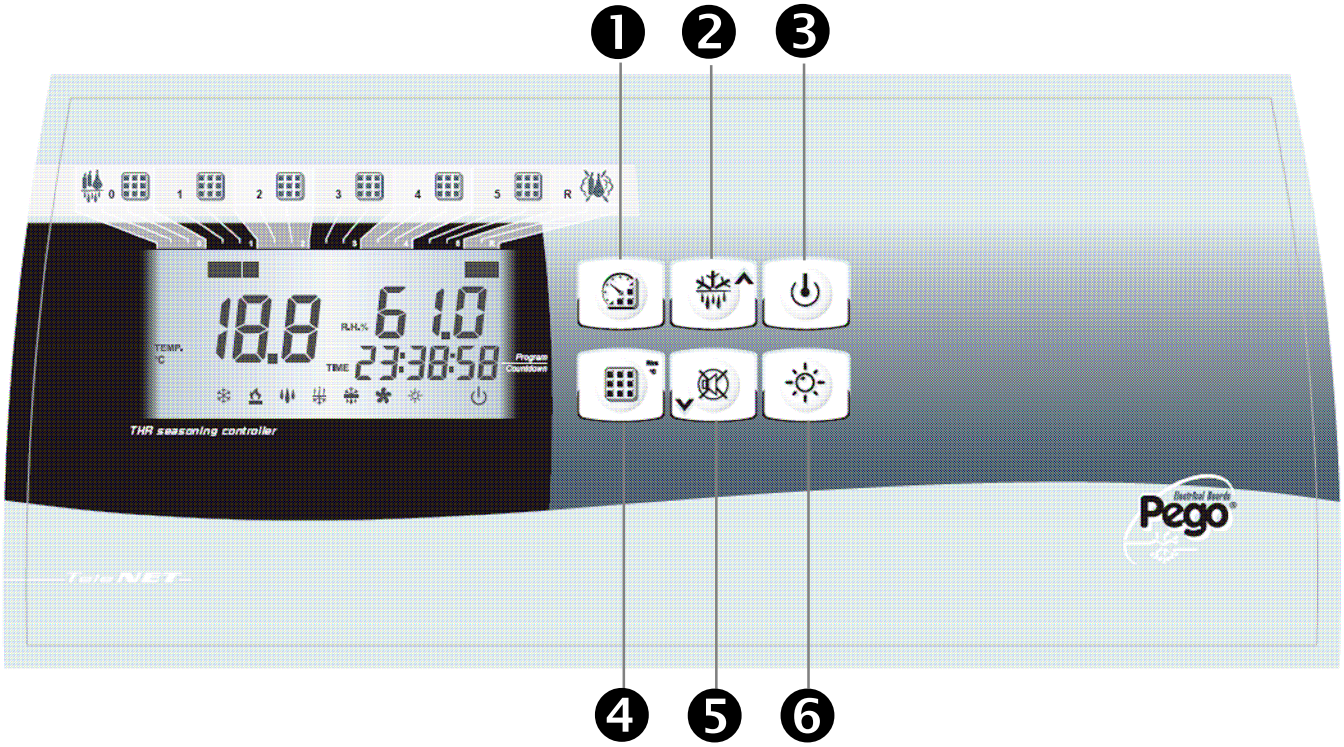
PEGO S.r.l. reserves the right to modify its products as it deems necessary without altering its
main characteristics. Each new release of a PEGO user manual replaces all the previous ones.

However not expressly indicated, the warranty follows the laws in force and particularly the section 1512 C.C. (Italian Civil Code)

For any controversy is elected by the parties and recognized the jurisdiction of the Court of Rovigo.

CHAPTER 5: PARAMETER PROGRAMMING

CONTROL PANEL 5.1



FRONTAL KEYBOARD 5.2

1
PROGRAM START/STOP (to press 5 sec for selecting the program to run, to press 5 sec for finishing a running program)
TIMER (displays remaining time of running phase with a single key press)

2
UP
MANUAL PAUSE and DEFROST (activates both functions)

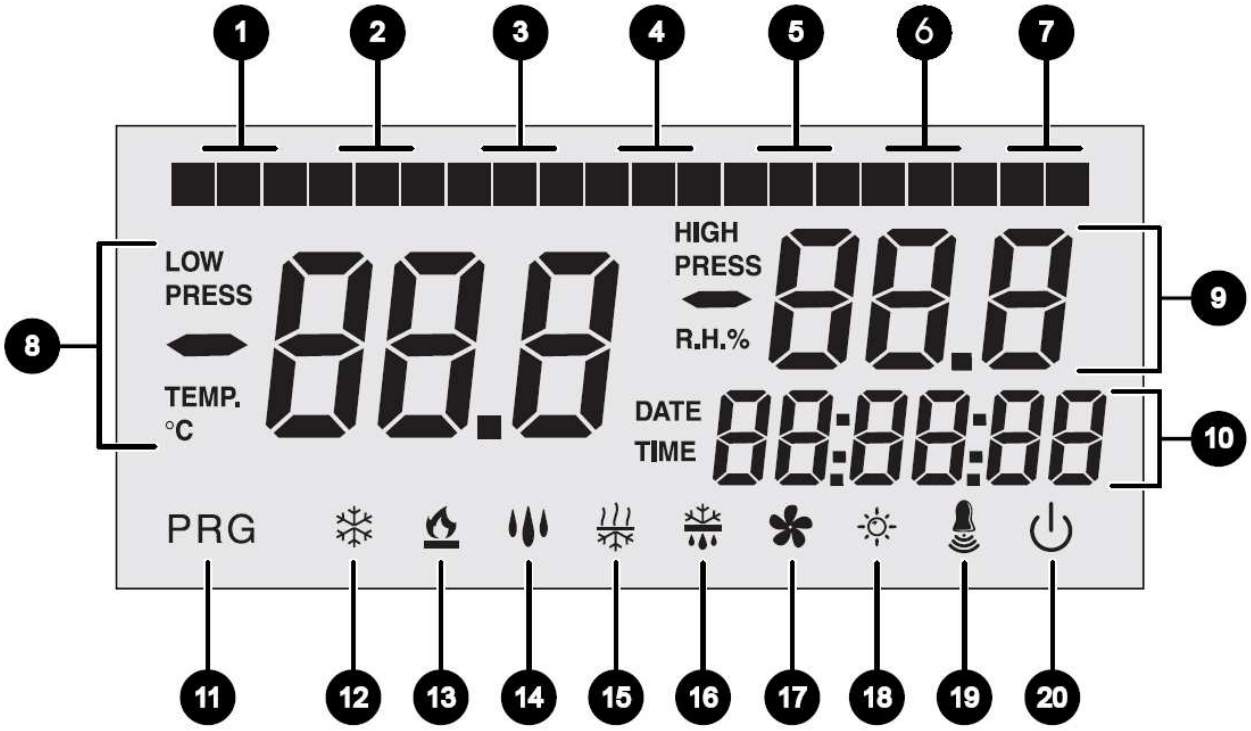
3
STAND BY (system ON/OFF, the running program maintains the count of remaining time)

4
SET ambient temperature and humidity (following pressures alternate temperature and humidity)

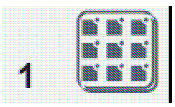
5 **DOWN / MUTE ALARM / FORCING AIR CHANGE**

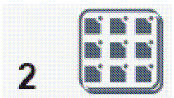
6 **ROOM LIGHT**

5.3 *DISPLAY LED*



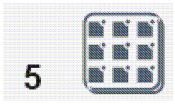
1 **PHASE 0 advancing/ Dripping / Day germination phase**

2  **PHASE 1 advancing**

3  **PHASE 2 advancing**

4 **PHASE 3 advancing**

5 **PHASE 4 advancing / Night germination phase**

6 

PHASE 5 advancing

7

Refreshment

8 → **Ambient temperature value/ parameters**

9 → **Ambient relative humidity / parameters value / error codes**

10 → **Time / date / time parameters value / running program / timer**

11 **PRG** **Programming (the controller is in programming phase)**

12 **Cold (flashing if called for dehumidification only)**

13 **Hot (flashing if called for dehumidification only)**

14 **Humidification**

15 **Dehumidification**

16 **Defrost**

17 **Fans**

18 **Light (flashing if the door switch is active)**

19 **Alarm**

20 **Stand-by**

5.4 *GENERAL FEATURES*

For safety reasons and to simplify the operator's work, the PLUS 100 THR has two programming levels; the first level is used to modify SETPOINT parameters (i.e. those parameters that are changed frequently). The second level is for general parameter programming of the various board work modes.
It is not possible to access the first programming level directly from the second level: you must exit the programming mode first.

5.5 *KEY TO SYMBOLS*

For practical purposes the following symbols are used:
• **(▲)** indicates the UP key used to increase value and to force the defrost / pause;
• **(▼)** indicates the DOWN key used to decrease value, to mute the alarm and to force the air changing.

5.6 *SET POINT PROGRAMMING AND DISPLAYING*

1. Push the **SET key** to display the current **SET POINT** (temperature and humidity alternately).

2. Press the **SET key** and push one of **(▲)** or **(▼)** keys to modify the **SET POINT** value.

Release the **SET key** to return to cold room temperature display; modifications are saved automatically.

FIRST LEVEL PROGRAMMING (User Level) 5.7

To access the first programming level proceed as follows:

1. Press the **(▲)** and **(▼) keys** simultaneously and keep them pressed for a few seconds until the first programming variable appears on the display.
2. Release the (▲) and (▼) keys.
3. Select the variable to be modified using the (▲) or (▼) key.
4. When the variable has been selected it is possible:
   - To display its setting by pressing **SET**
   - To modify its setting by pressing the **SET key** and the **(▲)** or **(▼)** buttons.

   When configuration values have been set you can exit the menu by pressing **(▲)** and **(▼)** simultaneously for a few seconds until the room temperature value appears.
5. The modifications are saved automatically when you exit the configuration menu.

LIST OF 1ST LEVEL VARIABLES (User Level) 5.8

VARIABLES	*MEANING*	*VALUES*	*DEFAULT*
dtC	**HOT temperature differential** with reference to main SET-POINT. It is expressed in absolute value and it defines the temperature hysteresis for the HOT referred to temperature SET POINT.	(dtn+0,2) ÷ 10 °C	2 °C
dtF	**COLD temperature differential** with reference to main SET-POINT. It is expressed in absolute value and it defines the temperature hysteresis for the COLD referred to temperature SET POINT.	(dtn+0,2) ÷ 10 °C	2 °C
dtn	**Temperature NEUTRAL zone** with reference to main SET-POINT. In neutral zone cold and hot are not activated; it includes symmetrically both a superior part (hot) and an inferior part (cold) as to temperature SET-POINT.	dtF>dtn ÷ 0 °C dtC>dtn ÷ 0 °C	0 °C
dUU	**HUMIDIFICATION differential** with reference to humidity SET-POINT. It is expressed in absolute value and it defines the humidification hysteresis referred to humidity SET-POINT	(dUn+1) ÷ 10 rH%	5 rH%
dUd	**DEHUMIDIFICATION differential** with reference to humidity SET-POINT. It is expressed in absolute value and it defines the dehumidification hysteresis referred to humidity SET-POINT .	(dUn+1) ÷ 10 rH%	5 rH%
dUn	**Humidity NEUTRAL zone** with reference to main SET-POINT . In neutral zone humidification and dehumidification are not activated; it includes symmetrically both a superior part (humidification) and an inferior part (dehumidification) as to humidity SET-POINT.	dUU>dUn ÷ 0 rH% dUd>dUn ÷ 0 rH%	0 rH%
d4	**Defrost interval** (hours). d4=0 disables the defrosts	0 ÷ 24 hours	0 hours
d5	**Maximum lenght of defrost** (minutes)	1 ÷ 60 min	10 min
d6	**End of defrost setpoint**. The defrost is not executed if the temperature read from defrost probe is superior to *d6* value. (In case of broken probe it will have a timing defrost)	-35 ÷ 45 °C	15°C
d7	**Dripping duration** (minutes) At the end of defrosting, the compressor and the fans remain still for the *d7* set time, the defrosting icon flashes.	0 ÷ 10 min	0 min

F5	**Fans pause** after defrosting (minutes) Enables keeping the fans still for an *F5* time after dripping. This time starts from the end of dripping. If dripping is not set, at the end of defrosting the fans pause occurs directly.	0 ÷ 10 min	0 min
At1	**Minimum temperature alarm** Enables defining a minimum temperature value to the ambient. Below value *At1*, the alarm status will be signalled with the alarm icon flashing, the temperature flashes and an internal buzzer acoustically signals the existence of an anomaly. The alarm is signalled after the Ald time.	-45 ÷ At2-1 °C	-45°C
At2	**Maximum temperature alarm** Enables defining a maximum temperature value to the ambient. Above value *At2*, the alarm status will be signalled with the alarm icon flashing, the temperature flashing and an internal buzzer acoustically signals the existence of an anomaly. The alarm is signalled after the Ald time. The alarm does not suspend any defrosting in progress.	At1+1 ÷ 45 °C	+45°C
AU1	**Minimum humidity alarm** Enables defining a minimum humidity value to the ambient to be humidified. Below the AU1 value, the Eu alarm status will be signalled with the alarm icon flashing and the buzzer active. Silencing, the humidity and the alarm icon remain flashing. The alarm is signalled after the Ald time.	1 ÷ AU2-1 Rh%	1 Rh%
AU2	**Maximum humidity alarm** Enables defining a maximum humidity value to the ambient to be humidified. Below the AU2 value, the Eu alarm status will be signalled with the alarm icon flashing and the buzzer active. By silencing, the humidity and the alarm icon remain flashing. The alarm is signalled after the Ald time. AU2=99 does not signal the alarm.	AU1+1 ÷ 99 Rh%	99 Rh%
rA	**Air change enabling in real time** With rA=1 it is possible to set up to 6 air changes in real time during one day, through parameters rA1…rA6.	0 = Disabled 1 = Enabled	0
rA1 ***…*** ***rA6***	**Air change times programming** It is possible to set up to 6 times for the air changes. The previous value blocks the subsequent one making them sequential.	00:00 ÷ 23:50	--
drA	**Air change duration**	0 ÷ 10 min	6 min
tEu	**Evaporator probe temperature display** (if dE =1 nothing is displayed)	temperature	only reading

SECOND LEVEL PROGRAMMING (Installer Level) 5.9

To access the second programming level press the UP **(▲)** and DOWN **(▼)** keys and the LIGHT key simultaneously for a few seconds.

When the first programming variable appears the system automatically goes to stand-by.

1. Select the variable to be modified by pressing the UP (▲) and DOWN (▼) keys.

When the parameter has been selected it is possible:

2. To display the parameter setting by pressing the SET key.

3. To modify the parameter setting by pressing the SET key and pressing the (▲) or (▼) key.

4. When setting has been completed you can exit the menu by pressing the (▲) and (▼)keys

simultaneously and keeping them pressed until the cold room temperature reappears.

5. Modifications are saved automatically when you exit the configuration menu.

6. Press STAND-BY to enable electronic control.

LIST OF 2ND LEVEL VARIABLES (Installer Level) 5.10

VARIABLES	*MEANING*	*VALUES*	*DEFAULT*
AC	**Microdoor input status** (with door closed)	0= usually open 1= usually closed	0
Pc	**main alarm digital input status**	0 = NA 1 = NC	0 = NA
F3	**Fans status when cold, hot, humidification and dehumidification are at a stand-still**	0 = Fans in continuous start 1 = Fans switched-off if cold, hot, humidification and dehumidification switched-off	1
F4	**Fans pause during defrosting**	0 = Fans working during defrosting 1 = Fans not working during defrosting	1
F6	**Evaporator fans activation for air recirculation**. The fans activate for a time defined by F7 if they have not started working for the F6 time. If activation time coincides with the defrosting time, end of defrosting is awaited. The speed of the fans (high/low) is the same as that selected for the phase in progress.	0 – 240 min 0 =(function not activated)	0 min

F7	**Evaporator fans duration for air recirculation.** Fans working time for F6	0-240 sec.	0:00:10
F8	**Fans speed during seasoning/preservation .** The value of this variable is amended based on the set-up made during the last phase of a performed program.	0= High speed 1= Low speed (only if rin=1)	0
Pr	**Refreshment period**. Interval between one refreshment and the subsequent one. The refreshment is a work pause in which cold, hot, humidifies and dehumidifies are disabled.	0 ÷ 24 hours (at 10 min steps) 0 = Disabled	0 h
dr	**Refreshment phase duration.**	1 ÷ 240 min	120 min
rin	**K7 Multifunction relay function** choice.	0= Refreshment 1= Fans low speed	0
Ald	**Signal delay and alarm display** time of minimum or maximum temperature or humidity.	(1 min ÷ 4 hours)	240 min
C1	**Minimum time between switch-off and subsequent ignition of the compressor**. It also stops the fans if they are not active for other functions	0...15 min	0
dEU	**Dehumidification method selection** The separate dehumidification calls hot and cold only for temperature	0= cooling 1= heating 2= separate dehumidification	0
EnU	**Humidification enabling**	0= disabled 1= enabled	1
End	**Dehumidification enabling**	0= disabled 1= enabled	1
Cat	**Ambient probe value correction**	-10...+10	0
CaU	**Humidity probe value correction**	-20...+20	0
EnH	**Hot enabling**	EnH= 1 hot enabled EnH= 0 hot disabled	1
Hr	**Humidity management**	Hr= 1 enables humidity management Hr= 0 disables humidity management The humidity probe can be disconnected without error on display. The evaporator probe is displayed instead of humidity (if dE= 0)	1
dE	**Evaporator probe exclusion**	=0 probe present =1 probe absent	1
d1	**Type of defrosting**, at cycle inversion (hot gas) or resistance. The compressor output is also activated with hot gas	1= with hot gas 0= with resistance	0
LSt	**Minimum value attributable to setpoint** of temperature	-45 ÷ HSt °C	-45°C

HSt	**Maximum value attributable to setpoint** of temperature	+45 ÷ LSt °C	+45°C
btF	Temperature **differential** referred to Setpoint for **COLD BLOCK**. It constitutes the SET-btF limit below which the cold call relay and the dehumidification relay are disabled.	0 ÷ 20 °C 0 = Disabled	2
btC	Temperature **differential** referred to Setpoint for **HOT BLOCK**. It constitutes the SET+btC limit above which the hot call relay , the humidification relay and the dehumidification relay are disabled.	0 ÷ 20 °C 0 = Disabled	2
dEt	**Limit time for DEHUMIDIFICATION**. If the dehumidification request is not satisfied (achievement of humidity SET) within the time (dEt), the variable (dEO) is taken into consideration for the operation to be performed. Counting starts at every new dehumidification request.	(0 min ÷ 4 hours) (1 min steps) 0 = Disabled	0
dEo	Operation to be performed in case Timeout for dehumidification (dEt) intervenes dEO= 0 an alarm signal (Ed) + buzzer + alarm relay is given. The alarm is displayed even when humidity set is achieved; it does not block the normal functioning and once silenced, the dEt count re-starts. dEO= 1 a refreshment of the duration (dr) is launched and the timer relating to the interval (Pr), if present, is recharged.	0= alarm only 1= a refreshment is performed.	0
Ad	Indirizzo di rete per il collegamento al sistema di supervisione TeleNET .	0 ÷ 31	0
Aut	Automatic cycles management or via TeleNET. For managing the cycles via TeleNET to set Aut=1	0 = local cycles 1 = TeleNET management	0
Cg	**Seasoning or germination selection**	0 = seasoning cycles active 1 = germination day/night cycle active	0
CgA	Not used.	0	0
tg2	Not used.	0	0

P1	**Password:** type of protection. (Active when PA is different from 0).	0= Total block. It is possible to only see the temperature and humidity set point. 1= Blocks access in 1st and 2nd level programmes. Blocks access in germination cycle amendment and programmes amendment. 2=Blocks access in 1st and 2nd level programmes. 3= Blocks access in 2nd level programmes.	3
PA	**Protection password**	0 – 999	
dMY	**Current date**	dd:mm:yy	
HMS	**Current time**	0:00...23:59	
reL	**Software release**	Shows the software release	(reading only) 6

5.11 *AUTOMATIC PROGRAMS Pr1, Pr2, Pr3, Pr4, Pr5*

To access the automatic programmes parameters, keep keys START/STOP and SET pressed for a few seconds (the function is active only if Cg=0).

1. Using key **(▲)** or key **(▼)** select the program to be amended. After having selected the program, press the SET key to display the parameters.

2. Using key **(▲)** or key **(▼)** select the parameter to be amended.

3. Amend the setting by keeping the SET key pressed and by pressing one of the keys **(▲)** or **(▼)**.

4. Once configuration values have been set, to exit the menu press keys **(▲)** and **(▼)** simultaneously keeping them pressed for a few seconds, until the temperature value appears.

5. Memorisation of the amendments made to the variables will happen automatically when exiting the configuration menu. Exiting from the menu happens spontaneously after an inactivity period or by simultaneously pressing keys**(▲)** and **(▼)** for a few seconds.

The following table represents any one of the Pr1, Pr2, Pr3, Pr4, Pr5 programmes.

VARIABLES	*MEANING*	*VALUES*	*DEFAULT*
CIC	CIC=0 at the end of the last program phase (phase 5) it moves to manual. CIC=1 at the end of the last timed phase (phase 5) it returns to initial phase (phase 0). An infinite loop of the phases is therefore created. CIC=2 at the end of the last program phase (phase 5) it moves on to the subsequent program.	0= it ends the program and moves on to manual. 1= loop phases 2= calls subsequent program	0
Sgt	Phase 0 or dripping phase temperature setpoint	-45 ÷ +45°C	0
SgU	Phase 0 or dripping phase humidity setpoint	0...99 rH% 0= disabled	60%
Sg	Dripping enabling	0= normal functioning 1= hot only enabled 2= hot, cold only enabled	0
Sgr	Refreshment	0= NO 1= YES	0
vSg	Dripping phase evaporator fans speed. Amends the value of 2nd level variable (F8)	0= High speed 1= Low speed (only if rin=1)	0
tSg	Dripping phase duration	0:00...99:30 (30 min steps)	0:00
St1	Phase 1 temperature setpoint	-45 ÷ +45°C	0
SU1	Phase 1 humidity setpoint	0...99 rH% 0= Disabled	60
rn1	Phase 1 refreshment	0= NO 1= YES	0
v1	Phase 1 evaporator fans speed. Amends the value of 2nd level variable (F8)	0= High speed 1= Low speed (only if rin=1)	0
t1	Phase 1 duration	0:00...99:30 (30 min steps)	0:00
St2	Phase 2 temperature setpoint	-45 ÷ +45°C	0
SU2	Phase 2 humidity setpoint	0...99 rH% 0= Disabilitata	60%
rn2	Phase 2 refreshment	0= NO 1= YES	0
v2	Phase 2 evaporator fans speed. Amends the value of 2nd level variable (F8)	0= High speed 1= Low speed (only if rin=1)	0
t2	Phase 2 duration	0:00...99:30 (at 30 min steps)	0:00
St3	Phase 3 temperature setpoint	-45 ÷ +45°C	0
SU3	Phase 3 humidity setpoint	0...99 rH% 0= Disabled	60%

rn3	Phase 3 refreshment	0= NO 1= YES	0
v3	Phase 3 evaporator fans speed. Amends the value of 2nd level variable (F8)	0= High speed 1= Low speed (only if rin=1)	0
t3	Phase 3 duration	0:00...99:30 (30 min steps)	0:00
St4	Phase 4 temperature setpoint	-45 ÷ +45°C	0
SU4	Phase 4 humidity setpoint	0...99 rH% 0= Disabled	60%
rn4	Phase 4 refreshment	0= NO 1= YES	0
v4	Phase 4 evaporator fans speed. Amends the value of 2nd level variable (F8)	0= High speed 1= Low speed (only if rin=1)	0
t4	Phase 4 duration	0:00...99:30 (30 min steps)	0:00
St5	Phase 5 temperature setpoint	-45 ÷ +45°C	0
SU5	Phase 5 humidity setpoint	0...99 rH% 0= Disabled	60%
rn5	Phase 5 refreshment	0= NO 1= YES	0
v5	Phase 5 evaporator fans speed. Amends the value of 2nd level variable (F8)	0= High speed 1= Low speed (only if rin=1)	0
t5	Phase 5 duration	0:00...99:30 (30 min steps)	0:00
St	Seasoning/preservation temperature setpoint	-45 ÷ +45°C	0
SU	Seasoning/preservation humidity setpoint	0...99 rH% 0= Disabled	60%
tSC	Seasoning/preservation end timeout	0 ÷ 240 days	0
vSC	Seasoning/preservation evaporator fans speed. Amends the value of 2nd level variable (F8)	0= High speed 1= Low speed (only if rin=1)	0

5.12 *GERMINATION DAY/NIGHT CYCLE*

To access the day/night cycle parameters for germination lights it is necessary to:

1. Check that parameter Cg=1

2. Keep keys **(▼)** DOWN and LIGHT pressed for a few seconds.

3. Using key **(▲)** or key **(▼)** select the parameter to be amended.

4. Amend the setting by keeping the SET key pressed and by pressing one of the keys **(▲)** or **(▼)**.

5. Memorisation of the amendments made to the variables will happen automatically when exiting the configuration menu. Exiting from the menu happens spontaneously after an inactivity period or by simultaneously pressing keys**(▲)** and **(▼)** for a few seconds.

VARIABLES	*MEANING*	*VALUES*	*DEFAULT*
tdS	**Day phase start time.** Germination lights active only during the day phase.	00:00 ÷ 23:50 (10 min steps)	0
tdE	**Day phase end time.** tdE can also be < of tdS; for example, a day phase can start at 10 pm and end at 4 pm of the following day.	00:00 ÷ 23:50 (10 min steps)	0
tt1	**t1 Temperature SET start time.**	00:00 ÷ 23:50 (10 min steps)	0
tt2	**t2 Temperature SET start time.**	00:00 ÷ 23:50 (10 min steps)	0
t1	**Temperature 1 SET.**	-45 ÷ +45°C	0 °C
t2	**Temperature 2 SET.**	-45 ÷ +45°C	0 °C

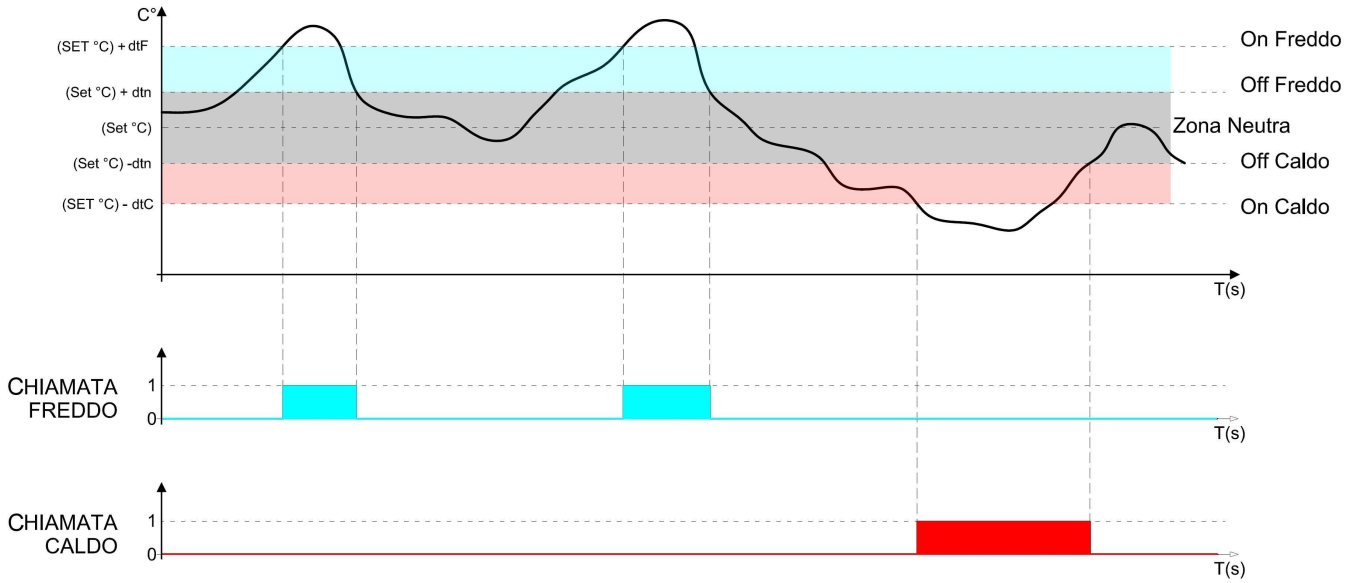
IGNITION OF PLUS 100 THR ELECTRONIC CONTROL 5.13

After having wired the electronic controller, apply voltage 230 Vac; the control will immediately and simultaneously emit a sound for a few seconds and remain fully switched-on on the display.

COLD/HOT: PRESERVATION OF AMBIENT TEMPERATURE 5.14

The cold and hot call is managed in neutral area depending on the set temperature setpoint (key 4) and to the temperature differentials (parameters dtC and dtF). The cold is activated upon exceeding of set + dtF and remains active until set is achieved (with dtn=0). The hot is activated below set - dtC and remains active until set is achieved (with dtn=0).

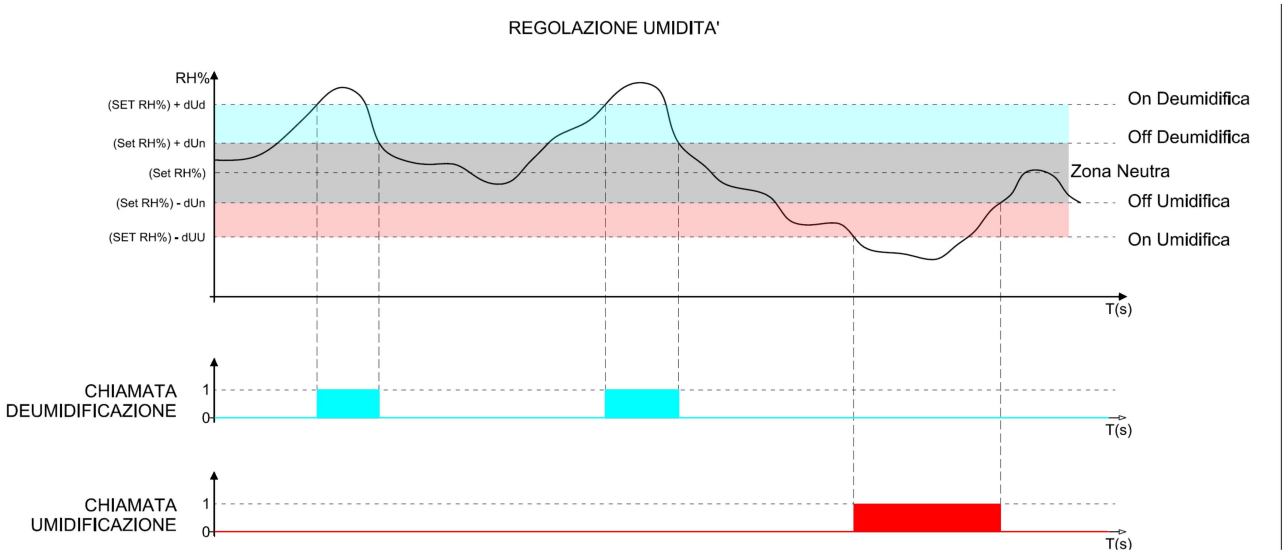
It is possible to set a "dead area" with parameters dtn that deactivates hot and cold when the temperature is between SET-dtn and SET+dtn.



Parameter C1 introduces a delay between a switch-off and the subsequent re-activation of the cold. Hot can be deactivated with parameter EnH (EnH=0 disables the hot relay in all conditions).

5.15 *HUMIDITY/DEHUMIDIFICATION: PRESERVATION OF AMBIENT HUMIDITY*

The humidity and the dehumidification call is managed in neutral area depending on the set humidity setpoint (key 4) and to the humidity differentials (parameters dUU and dUd).
Dehumidification is activated upon exceeding of set + dUd and remains active until set is achieved (with dUn=0). Humidification is activated below set - dUU and remains active until set is achieved (with dUn=0).
It is possible to set a "dead area" with parameters dUn that deactivates humidification and dehumidification when humidity is between SET-dUn and SET+dUn.
The humidity management can be excluded with parameter Hr.
Dehumidification only can be excluded with parameter End.
Humidification only can be excluded with parameter EnU.
There are three dehumidification methods (parameter dEU):
1. Dehumidifies with the cold (the cold is called to dehumidify, the hot is added only to maintain ambient temperature)
2. Dehumidifies with the hot (the hot is called to dehumidify, the cold is added only to maintain ambient temperature)
3. Separate dehumidification (only the dehumidification output activates but hot and cold are not called)
It is possible to give a maximum time for the dehumidification phase (parameter dEt) by signalling an alarm or forcing a refreshment (parameter dEo)..



5.16 VENTILATION

The parameters of the second level programming F3, F4, F6, F7, F8 enable setting the management of the fans in the different modes.

By setting parameter rin=1, it is possible to differentiate high and low speed of the fans in the various phases of a program (parameters vSg, v1, v2, v3, v4, v5, vSC).

5.17 AIR CHANGE

The air changes can be enabled with parameter rA. Up to six daily execution times for air change can be set in parameters from rA1 up to rA6.

The duration of the air change is defined by parameter drA.

During air change, hot, cold, humidity and dehumidification do not activate.

It is possible, at any time, to force an air change with the DOWN key.

5.18 *PAUSE*

The refreshment is a phase of the pause process of the temperature and humidity management. Refreshments are managed with parameters Pr and dr.
Pr defines the interval between one refreshment and the following one, dr defines the duration of the refreshment.

It is possible, at any time, to force an air change with the UP key. (a defrosting is also simultaneously activated).
To interrupt a refreshment, position the control in stand-by (the times are reloaded).

5.19 *DEFROST*

Defrosting can be managed with parameters d4, d5, d6, d7, F5 that define the intervals, the maximum duration, the defrosting end temperature, the dripping and the fans stop. To manually activate defrosting it is sufficient to press the UP key. Defrosting is not activated in case the temperature set for defrosting end (d6) is lower than the temperature detected by the evaporator probe. Defrosting will complete upon reaching the defrosting end temperature (d6) or for defrosting maximum duration (d5).

5.20 *HOT GAS DEFROST*

Set parameter d1 = 1 for managing cycle inversion defrosting.
The compressor relay and the defrosting relay are activated for the entire defrosting phase.
For the correct management of the plant, it will be the responsibility of the installer to use the defrost output, that must allow the opening of the cycle inversion electrovalve and the closing of the liquid electrovalve.
For the capillary plants (without thermostatic valve) it is sufficient to control the cycle inversion electrovalve using the defrosting relay control.

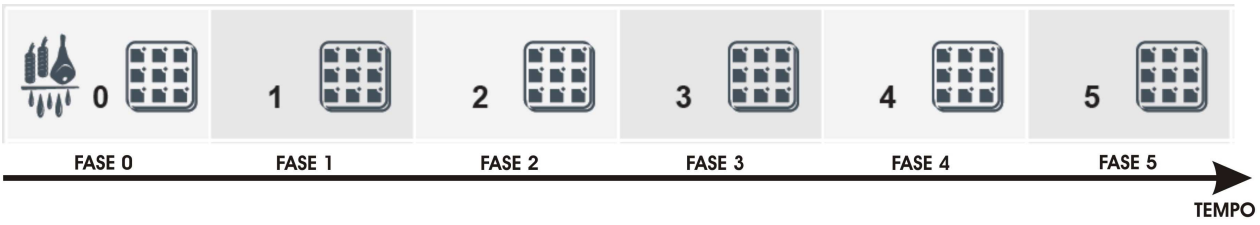
PASSWORD FUNCTION 5.21

The password function activates by setting a value different from 0 for parameter PA. See parameter P1 for the different protection levels.
Protection is enabled automatically after approx. 2 minutes of inactivity on the keyboard.
Numbers 000 appear on the display.
By keeping SET pressed, the first digit flashes for amendment using up/down arrow.
Release SET and press SET again: the second amendable digit flashes.
Release SET and press SET again: the third amendable digit flashes.
The operation is cyclical and therefore by pressing SET again, the first
digit flashes again, and so-on.
If password is forgotten use universal number 100.

AUTOMATIC PROGRAMS 5.22

An automatic program is a work cycle made of a maximum of 7 phases in which it is possible to automatically amend the temperature and the humidity set point when passing from one phase to the following one.
In each phase it is possible to choose whether to enable or not the movements (managed with parameters Pr and dr) and manage a different speed for the fans.

It is possible to set up to 5 programmes (identified with Pr1, Pr2, Pr3, Pr4, Pr5) each of which has a different setting according to the table of paragraph 5.10.
For each program, the first phase is defined dripping or phase 0; 5 process phases follow.
The last phase is the seasoning/preserving phase with unlimited duration in time.



Each phase and the dripping are characterised by:
Temperature setpoint
• Humidity setpoint
• Refreshments enabling/disabling
• High or low fans speed
• Phase duration (maximum 99 hours with 30 min steps)

For the dripping phase it is possible to exclude the humidity and the cold management.
The program starts by pressing the START key for a few seconds, the program selection and, therefore, the pressing of the SET key.

Program start:

1) press the START key for a few seconds

2) using the UP and DOWN arrows select the wanted program

3) press the SET key to start the program

The time evolution is highlighted by the advancing bars. During program execution, it is possible to amend the humidity and temperature setpoint directly from the keyboard without having to access programming. Variations are provisional and do not alter the pre-set program.
If a phase has 0 time, it moves on to the following one.
The times of the phases proceed even in case of no electric power supply or control stand-by.
Using the START key (pressed briefly) it is possible to see the remaining time of the phase in progress.
With parameter CIC, it is possible to program a cycle (once the program has finished it automatically starts from the beginning) or to hook programmes between them, in order to have a greater number of phases of the 6 of the individual program.

A program can always be interrupted by pressing the START/STOP key for a few seconds.

DAY/NIGHT CYCLE FOR GERMINATION LIGHTS 5.23

By setting parameter Cg (Germination/seasoning cycle) at second programming level, it is possible to choose the use of the programmes or a special program suitable for day/night cycles:

Cg = 0 (default) activates the automatic programmes management for seasoning;

Cg = 1 activates the management of the germination day/night cycle.

By means of the parameters indicated in paragraph 5.11, it is possible to determine the day start and end times and manage two differential temperature setpoint.

During the day phase, the germination lights are switched on and the display shows the references of phase 0 switched-on. During the night phase, the germination lights are switched-off and the references of phase 4 switch-on.

The connection of the germination lights is separate from the cell light, that can be used as service light (managed as usual from the microdoor and the light key).

The day/night cycle starts by pressing the cycle start key.

CHAPTER 6: MAINTENANCE

GENERAL SECURITY RULES 6.1

For any type of maintenance , it must be exclusively executed by skilled technical staff.

In case of break down or maintenance to the electrical system, before proceeding please cut off voltage to the panel placing general power supply switch on open position (O). Check the absence of voltage with a tester before doing any operation.
Each element of the panel, if defective, must be replaced only with original spare parts.

If the intervention is on external parts of panel follow the next steps:

- Switch off safely the panel power supply in one of the following ways:

1) Put 300 Expert main switch on OFF position and block it with a mechanical block and then using a padlock.

2) Cut off power supply upstream the panel permanently, using a padlock (on OFF position).

- Place signals indicating maintenaince in progress.

Before proceeding with maintenance operations please follow these security prescriptions:

- The electrical panel must be without voltage.
- Prevent the presence of unauthorized staff around the intervention area.
- Positioning of suitable notices to signal "Device under maintenance".
- Wear suitable and without free appendixes work cloths (overalls, gloves, shoes, headgears).
- Remove if worn, every object which can get entangled in any part of the panel.
- Suitable tools for the maintenance operations must be at disposal.
- Tools must be correctly cleaned and greased.
- Necessary technical documentation to execute maintenance intervention must be at disposal (wiring diagrams, tables, drawings, etcc….)
- At the end of the maintenance operations please remove all the residual materials and make a careful cleaning inside the panel.

It’s absolutely forbidden to accomodate additional parts inside the panel.

The manufacturer declines every responsibility in case all the points descripted in this chapter are not observed.

MAINTENANCE 6.2

The maintenance is necessary to ensure the electrical panel functionalities during the time and to avoid that damaging of a few elements can put people in danger.
It must be done by skilled and authorized technical staff respecting the general security rules

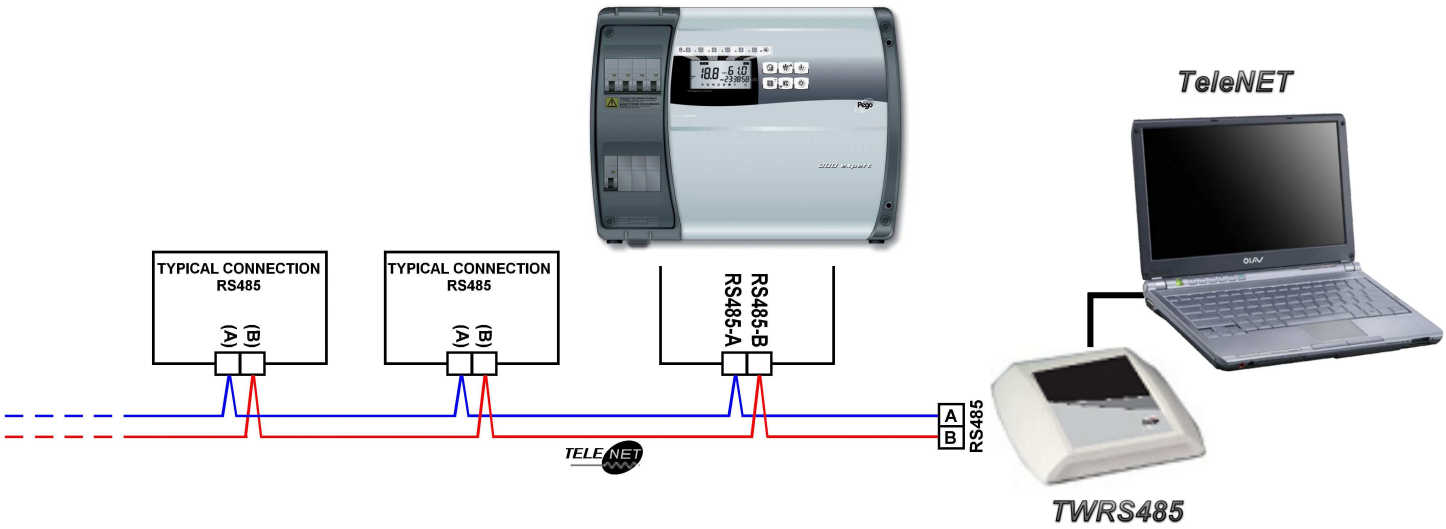
DEVICE	TYPE OF INTERVENTION	FREQUENCY
Terminal block ***Device screws***	*Wires tightening*	After first 20 days of functioning
Terminal block ***Device screws***	*Wires tightening*	Annual

CHAPTER 7: OPTIONAL KITS

TELENET MONITORING AND SUPERVISION SYSTEM 7.1

To insert the board in a ***TeleNET*** network, refer to the layout below. To configure the instrument, refer to the ***TeleNET*** manual.

IMPORTANT: During configuration, select " *PLUS 100 THR -R Controller* " under the item “Module”.



CHAPTER 8: DIAGNOSTIC

8.1 *DIAGNOSTIC*

In the event of a fault the **PLUS 100 THR** controller warns the operator by displaying an alarm code and emitting a warning sound via the buzzer inside the control console.
If alarm conditions arise, the display will show one of the following messages:

ALLARM CODE	***POSSIBLE CAUSE***	***OPERATION TO BE PERFORMED***
E0	*Temperature sensor fault*	• Check the room temperature sensor • If the problem persists replace the sensor
E1	*Humidity sensor fault*	• Check the humidity sensor • If the problem persists replace the sensor
E2	*Defrost sensor fault* (In this case eventual defrosts will last as d5)	• Check the defrost sensor • If the problem persists replace the sensor
E3	*Eeprom alarm* An error in the EEPROM memory has been detected. (all output deactivated except the alarm ones)	• Switch system off and back on again
E4	*Software compatibility error*	• Check for proper match between MASTER board and console board
E6	*Flat battery alarm*	• Replace lithium battery (CR2032 type) of the Console
Ec	*General alarm* (e.g. overheat or max pressure switch) (All outputs, except alarm, if present, are deactivated)	• Check compressor absorption • If the problem persists, to contact the technical assistance service
En	*No connection between the Console and the MASTER* board.	• Check the connection between the two units. • If the problem persists, to contact the technical assistance service
Eu	*Minimum or maximum humidity alarm.* A humidity higher or lower to that set for minimum or maximum humidity alarm has been reached in the ambient (*See variables AU1 and AU2, user programming level*)	• Check humidity management. • The probe does not correctly detect the humidity.
Et + ***Temperature on display is flashing***	*Minimum or maximum temperature alarm.* A temperature higher or lower to that set for minimum or maximum temperature alarm has been reached in the ambient (*See variables At1 and At2, user programming level*)	• Check the compressor status. • The probe incorrectly detects the temperature or the stop/start control of the compressor does not work.
Ed	*Limit Timeout for dehumidification*	• Check humidity management. • The probe does not correctly detect the humidity.

APPENDICES

A.1 *EC DECLARATION OF CONFORMITY*

COSTRUTTORE / MANUFACTURER

PEGO S.r.l. Via Piacentina, 6/b 45030 Occhiobello (RO) – Italy –
Tel. (+39) 0425 762906 Fax. (+39) 0425 762905

DENOMINAZIONE DEL PRODOTTO / NAME OF THE PRODUCT

MOD.: PLUS 300 EXPERT U THR

IL PRODOTTO E' CONFORME ALLE SEGUENTI DIRETTIVE CE:
THE PRODUCT IS IN CONFORMITY WITH THE REQUIREMENTS OF THE FOLLOWING EUROPEAN DIRECTIVES:

Direttiva Bassa Tensione (LVD):	**2006/95/CE**
Low voltage directive (LVD):	***EC/2006/95***
Direttiva EMC:	**2004/108/CE**
Electromagnetic compatibility (EMC):	***EC/2004/108***

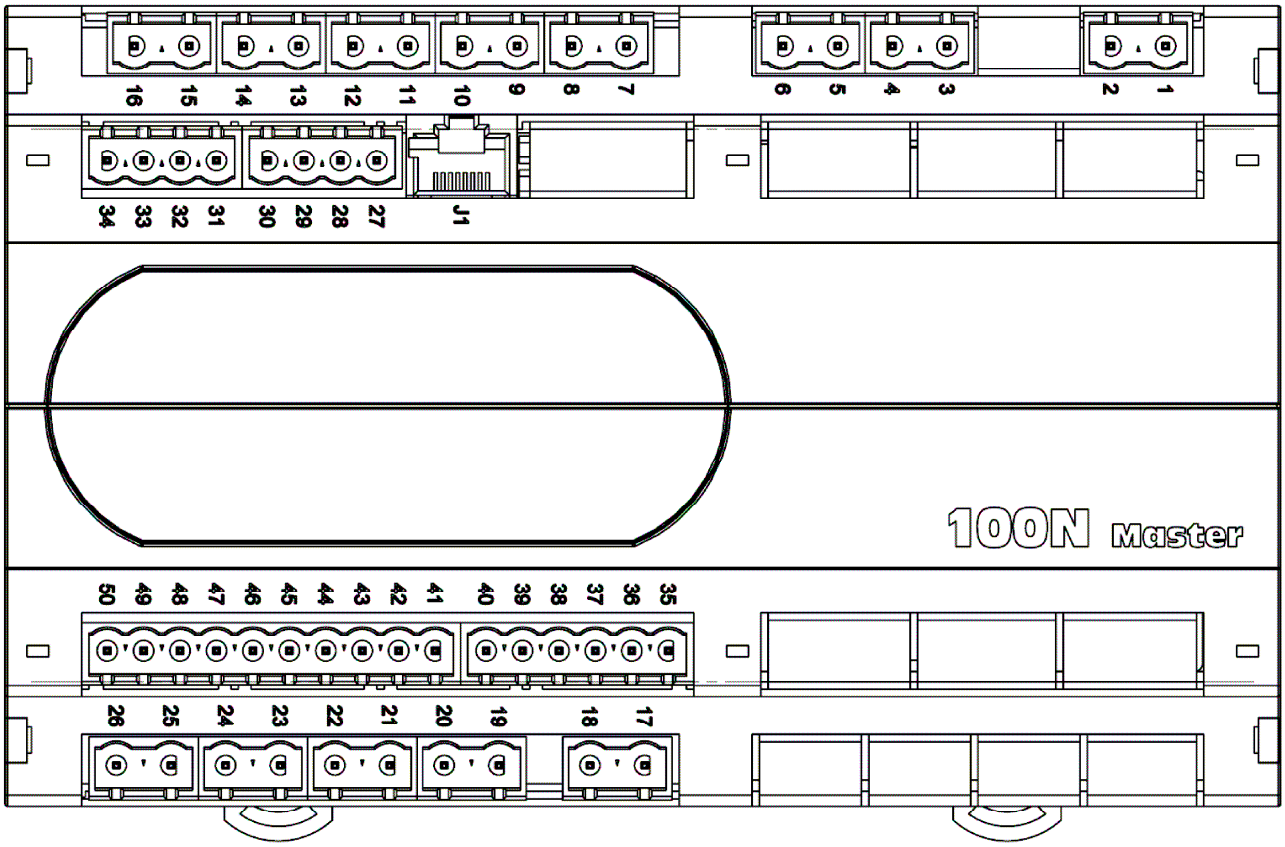
LA CONFORMITA' PRESCRITTA DALLA DIRETTIVA E' GARANTITA DALL'ADEMPIMENTO A TUTTI GLI EFFETTI DELLE SEGUENTI NORME (comprese tutte le modifiche):
THE CONFORMITY WITH THE REQUIREMENTS OF THIS DIRECTIVE IS TESTIFIED BY COMPLETE ADHERENCE TO THE FOLLOWING STANDARDS (including all amendments):

Norme armonizzate:	**EN 60730-1, EN 60730-2-9, EN 61000-6–1, EN 61000-6–3**
European standards:	***EN 60730-1, EN 60730-2-9, EN 61000-6–1, EN 61000-6–3***

IL PRODOTTO E' COSTITUITO PER ESSERE INCORPORATO IN UNA MACCHINA O PER ESSERE ASSEMBLATO CON ALTRI MACCHINARI PER COSTITUIRE UNA MACCHINA CONSIDERATE DALLA DIRETTIVA: 2006/42/CE "Direttiva Macchine".
THE PRODUCT HAS BEEN MANUFACTURED TO BE INCLUDED IN A MACHINE OR TO BE ASSEMBLED TOGHETER WITH OTHER MACHINERY TO COMPLETE A MACHINE ACCORDING TO DIRECTIVE: EC/2006/42 "Machinery Directive".

Paolo Pegorari

100N Master PLUS 300 EXPERT U THR WIRING DIAGRAM



Power supply section

1-2 Power supply 230VAC 50/60 Hz

Analogical/digital inputs section

29-30 Evaporator NTC probe

31-32 Humidity probe 4..20 mA (0-100Rh%) (32=V+ 31=Y)

27-28 Ambient NTC probe

45-50 Stand by forcing

44-50 Disables hot (forces variable EnH=0)

43-50 Disables humidity (forces variable Hr=0)

42-50 Microdoor

41-50 Main alarm (stops all outputs)

35-36 - + 12V

37-38 RS485 console

Outputs section (contacts without voltage)

21-22 Alarm

23-24 Defrosting

25-26 Dehumidification

15-16 Refreshment (rin=0)/ low speed fans (rin=1)

13-14 Air change

11-12 Humidification

9-10 Cell light

7-8 Fans (high speed if rin=1)

5-6 Hot

3-4 Cold

TeleNET Section:

39 *line A or clamp 3 of TWRS485*

40 *line B or clamp 4 of TWRS485*

NOTES

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